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National Institute of Environmental Health Sciences

Habitat suitability mapping of Anopheles darlingi in the surroundings of the Manso hydropower plant reservoir, Mato Grosso, Central Brazil

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Abstract:

BACKGROUND: Hydropower plants provide more than 78 % of Brazil's electricity generation, but the country's reservoirs are potential new habitats for main vectors of malaria. In a case study in the surroundings of the Manso hydropower plant in Mato Grosso state, Central Brazil, habitat suitability of Anopheles darlingi was studied. Habitat profile was characterized by collecting environmental data. Remote sensing and GIS techniques were applied to extract additional spatial layers of land use, distance maps, and relief characteristics for spatial model building. RESULTS: Logistic regression analysis and ROC curves indicate significant relationships between the environment and presence of An. darlingi. Probabilities of presence strongly vary as a function of land cover and distance from the lake shoreline. Vector presence was associated with spatial proximity to reservoir and semi-deciduous forests followed by Cerrado woodland. Vector absence was associated with open vegetation formations such as grasslands and agricultural areas. We suppose that non-significant differences of vector incidences between rainy and dry seasons are associated with the availability of anthropogenic breeding habitat of the reservoir throughout the year. CONCLUSION: Satellite image classification and multitemporal shoreline simulations through DEM-based GIS-analyses consist in a valuable tool for spatial modeling of A. darlingi habitats in the studied hydropower reservoir area. Vector presence is significantly increased in forested areas near reservoirs in bays protected from wind and wave action. Construction of new reservoirs under the tropical, sub-humid climatic conditions should therefore be accompanied by entomologic studies to predict the risk of malaria epidemics.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1851006

Resource Description

Exposure : ⊠

weather or climate related pathway by which climate change affects health

 Meteorological Factors, Temperature

Geographic Feature: ⊠

resource focuses on specific type of geography

 Freshwater, Tropical, Other Geographical Feature

   Other Geographical Feature : reservoir,semi-deciduous forests,Cerrado woodland

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Geographic Location: ☒

resource focuses on specific location

 Non-United States

   Non-United States: Central/South America

Health Impact: ☒

specification of health effect or disease related to climate change exposure

 Infectious Disease

   Infectious Disease: Vectorborne Disease

      Vectorborne Disease: Mosquito-borne Disease

Resource Type: ☒

format or standard characteristic of resource

 Research Article

Timescale: ☒

time period studied

 Time Scale Unspecified